NOAA HF-RADAR
Product/Service Description Document

Part 1 – Mission Connection

1. Product Description:

Various academic, meteorological, and oceanographic institutions and contributing partners of the Integrated Ocean Observing System (IOOS) have implemented High Frequency Radar (HF Radar) sites in their local coastal regions around the continental United States. These radar sites provide coastal-ocean surface current and wave information offshore out to 300 km. The National Oceanic and Atmospheric Administration (NOAA) has undertaken a project in association with the Scripps Institution of Oceanography (SIO) and the National Data Buoy Center (NDBC) to combine the data measured from these IOOS partner radar sites onto a national grid and display the surface currents graphically in the form of vectors on the NDBC website.

Note: This is a demonstration of the HF Radar display capability currently available. The HF Radar vector data has not been quality controlled.

The user can access the NOAA HF Radar site at the NDBC website and select a region of interest. Once selected, the site will graphically display the surface current vectors (speed and direction) within the user selected region. This region may be magnified or reduced. The site will also provide a user-option of displaying the data from marine weather stations (buoys and fixed) that are ingested by the NDBC. The data may be viewed from current time back to 24 hours. Data older than 24 hours will be accessible in the future (initial website will only provide most recent 24 hours of data).

2. Purpose:

Real-time surface current information is a valuable supplement to understanding coastal air-sea interaction. Coastal surface current information may be correlated to winds and tidal currents among other physical phenomena.

3. Audience:

The audience for this product is anticipated to be widely varied. Anyone from researchers to recreational beach goers may utilize this information. It is conceivable that outside entities may use HF Radar data for search and rescue activities or possibly to track movement of hazardous material (oil) spills. Mariners may use this information in their evaluation of their sea-going operations. The general public may use this information for off-shore recreational activities.

4. Presentation Format.

The surface currents are displayed graphically using Java scripting. This allows the user

to interactively define the region of interest. Since the surface current vectors are not memory intensive, only north-south and east-west velocity magnitudes with latitude and longitude are required, data will be accessible for down-loading in ASCII format.

5. Feedback Method

We are always seeking to improve our services based on user feedback. Comments regarding the NOAA HF Radar observations should be sent to the feedback email address on the webpage.

Inquires into NOAA HF Radar may also be made to:
National Data Buoy Center
Building 1100
John C. Stennis Space Center, MS 39529
Attn: Don Conlee
228 688 1753
don.conlee@noaa.gov

Experimental Feedback Period: 01 November 2006 through 01 May 2007.

Part II – Technical Description

1. Format and Science Basis

The final configuration of the NOAA HF Radar Web site established in Phase III, will be by direct query of the data portal servers from the NOAA HF Radar server at the NDBC (Figure 1). At the end of this phase (~March 2007), the NDBC shall be an autonomous data node, capable of handling data storage, data communications and web display of QA/QC HF radar data for the available and participating IOOS partner HF radar sites within the 48 contiguous US states. Rutgers University will have the same capabilities as the NDBC serving as a backup data node together with the SIO to provide fail safe access to real-time HF radar data. Each region in the national network will store information from IOOS partner HF Radar sites for future access and online distribution as needed and determined by the individual institution. SIO will provide a server to the NDBC capable of storing the initially available data for the East coast region. The East coast region defined for the East coast Regional HF Radar grid stretches from Maine all the way around Florida to Texas. Figure 2 illustrates the network architecture at the data node and below.
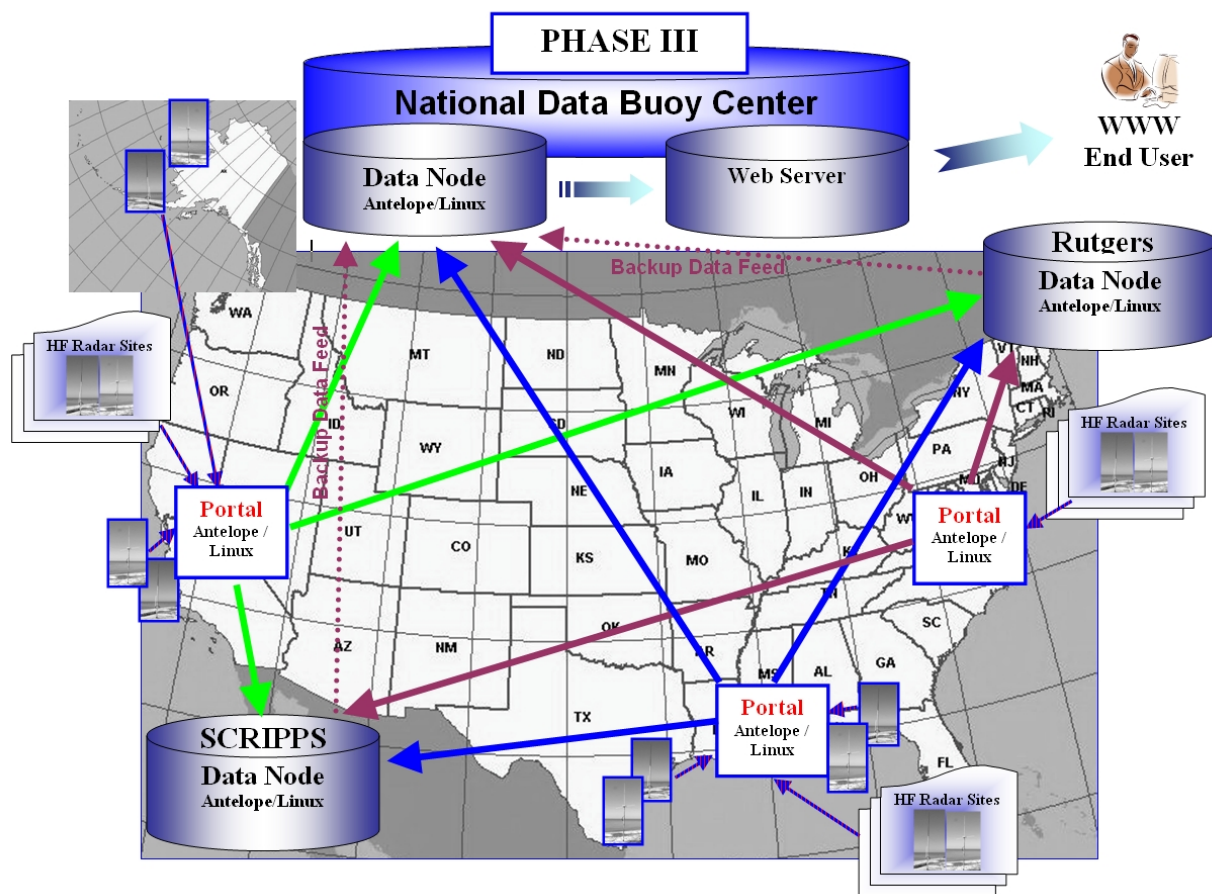
Figure 1: Phase III: Independent redundant NDBC Network for Real Time Vector Distribution. Proposed completion of this phase is February 28, 2007.
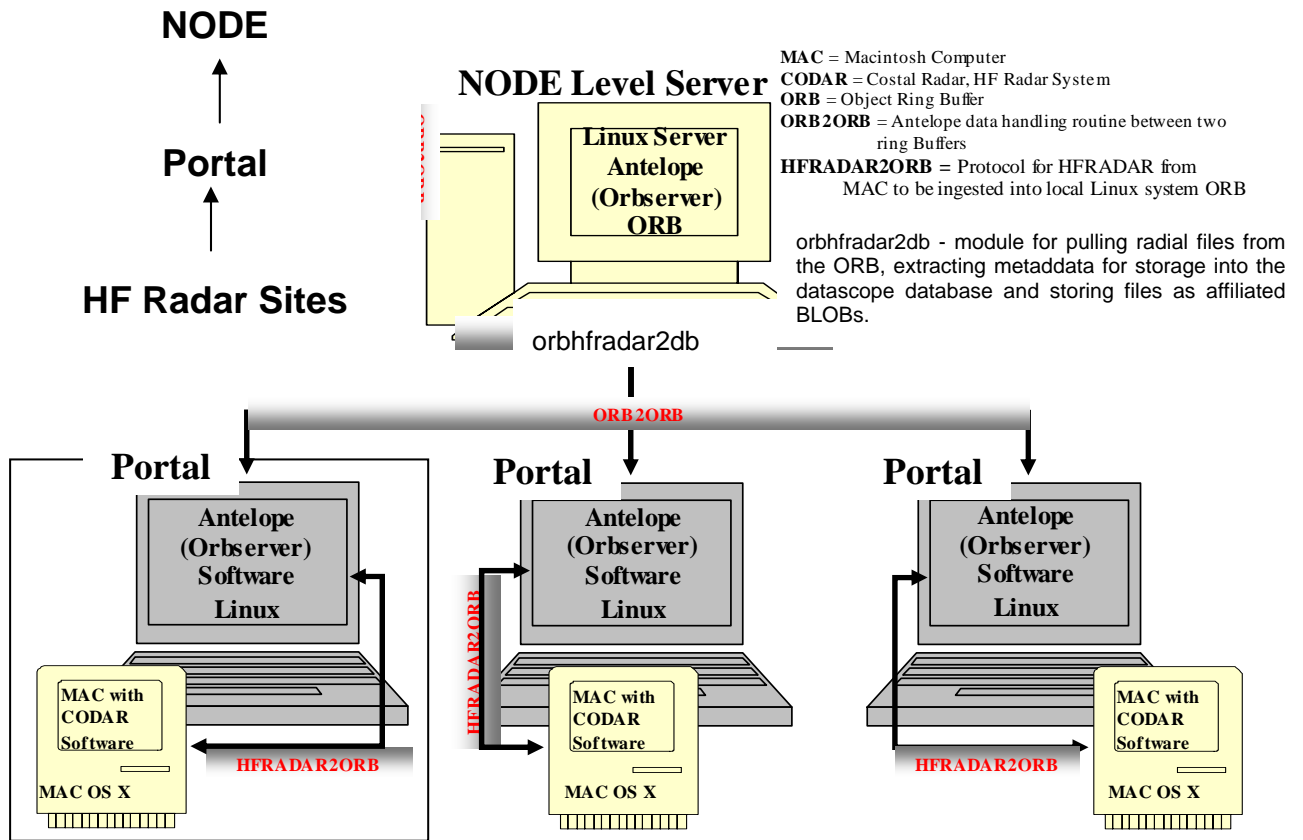
Figure 2: Diagram showing generalized Network Architecture at and below the Node level.

Necessary Software and Hardware scans to be included in development by the NDBC to install the SIO hardware/software setup behind the NASA and the NDBC firewalls, are the NESSUS Vulnerability Scan and the Harris Stat Scan. Both software scans need to be run by the NDBC either before installation or during installation on site at Stennis Space Center, the latter will take more time for the installation process.
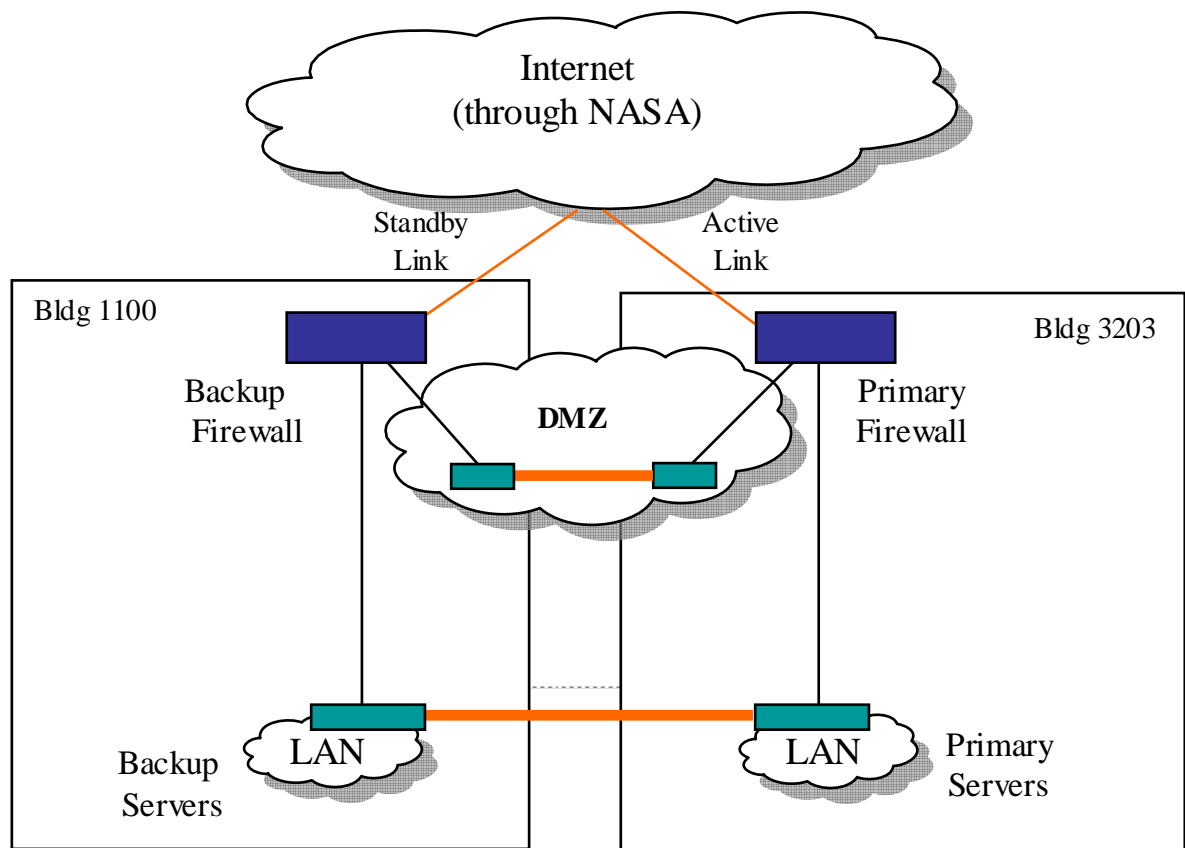
Figure 3: Current NDBC Logical Network

Figure 3 depicts the generalized setup of the existing network structure at NDBC's Stennis Space Center site. The figure shows the DMZ (unsecured De-Militarized Zone) behind the primary and Backup Firewalls within NDBC's own network. The Internet will be accessed through the NASA Firewall, requiring another set of security protocols to be followed.

Data Display on World Wide Web

The web site will deliver content via a Java applet. This applet is currently being developed on Java runtime version 1.5.0_04 but it is targeted to run on any version supporting Swing, such as 1.4.2_03 or later. The content will include maps and other imagery, vector fields for NOAA HF radar data, and marine weather station data. Menus will allow for navigating to various views, choosing the content to be displayed, set user preferences, and access online help. Other controls allow the user to zoom and pan, move back and forth in time, animate in time, and download data. The main panel of the display will also feature rollover information, continuous Lat/Lon readout, popup menus, and hyperlinks to marine weather station information. The applet relies on databases on one or more servers for map data, HF data, and marine weather station data. Currently these databases are running 'MySql', but any SQL-92 compatible database can be used. Data is pulled from the databases via HTTP requests and SQL queries. As necessary the applet will cache data and there may be additional caching at the server, such as for database federation.
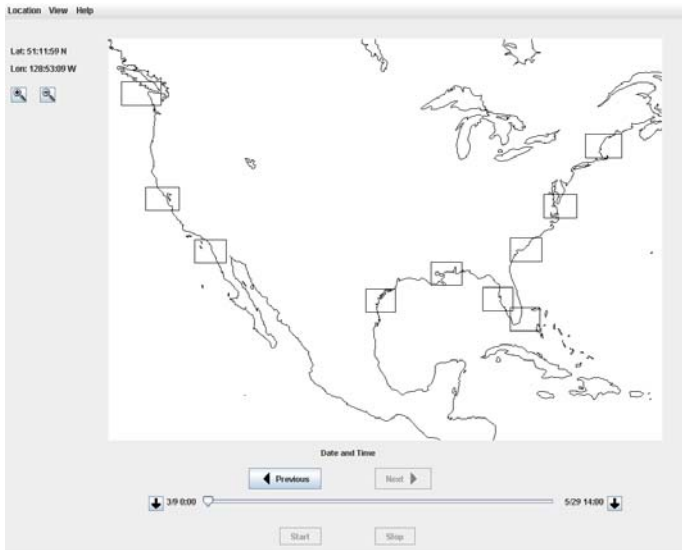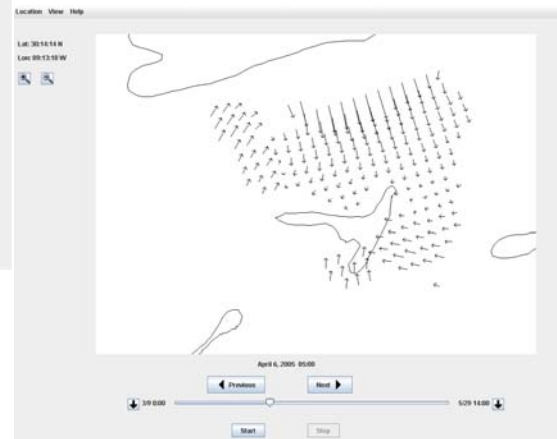

Figure 4: US Map with (at this point) predefined sites of planned or operating IOOS HF Radar Systems

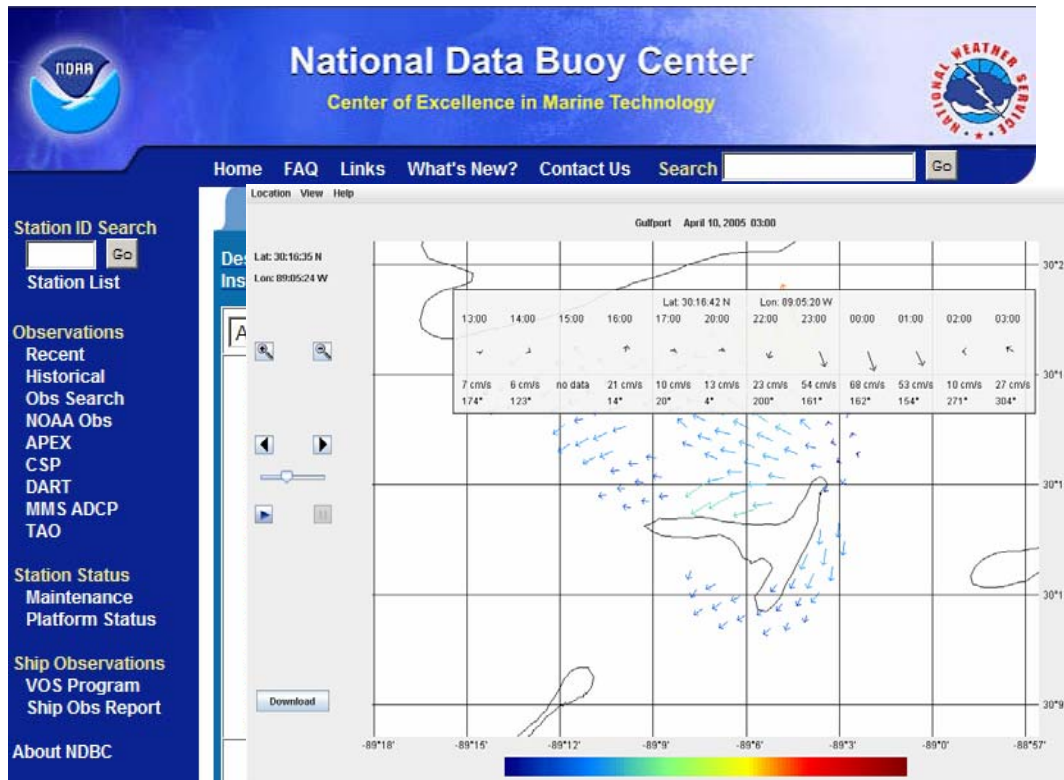**Figure 5: Single HF Radar Site Total Vector Coverage**

Figure 6: Representation of Surface Currents integrated into NDBC's current Web Display. 12 hour history graph of surface currents at point source within the radar coverage

2. Product Availability -

The site will be available 24 hours per day, 7 days per week. Surface current vector data will be updated hourly.